AMENDMENTS TO THE CLAIMS

Please enter the following amendments:

1. (Currently Amended) An apparatus for determining, based on speech waveform data, a portion ~~reliably~~ representing a feature of the speech waveform, comprising:

extracting means for calculating, from said data, a distribution of energy of a prescribed frequency range of said speech waveform along a time axis, and extracting, among various syllables, a first portion of said speech waveform that is generated stably by a source of said speech waveform, based on the distribution of energy and pitch of said speech waveform;

estimating means for calculating, from said data, a frequency spectrum distribution ~~of spectrum~~ of said speech waveform along the time axis, and estimating, based on the frequency spectrum distribution ~~of spectrum~~, a second portion of said speech waveform, for which change is well controlled by said source; and

means for determining the portion ~~reliably~~ representing [[a]] the feature of said speech waveform based on the first portion extracted by said extracting means and the second portion estimated by said estimating means.

2. (Currently Amended) The apparatus according to claim 1, wherein

said extracting means includes:

voiced/unvoiced determining means for determining, based on said data, whether each segment of said speech waveform is a voiced segment or not,

means for separating said speech waveform into syllables at a local minimum of said waveform of energy distribution of the prescribed frequency range of said speech waveform on the time axis; and

means for extracting that range of said speech waveform which includes, in each syllable, an energy peak in that syllable within the segment determined to be a voiced segment by said voiced/unvoiced determining means and in which the energy of the prescribed frequency range is not lower than a prescribed threshold value.

3. (Currently Amended) The apparatus according to claim 1, wherein

said estimating means includes:

linear predicting means for performing linear prediction analysis on said speech waveform and outputting an estimated value of formant frequency;

first calculating means for calculating, using said data, a distribution ~~of non-reliability of~~ based on the estimated value of formant frequency provided by said linear predicting means on the time axis;

second calculating means for calculating, based on an output from said linear predicting means, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform; and

means for estimating, based both on said distribution on the time axis ~~of non-reliability of~~ based on the estimated value of formant frequency calculated by said first calculating means and on said distribution on the time axis of local variance of spectral change in said speech waveform calculated by said second calculating means, a range in which change in the speech waveform is well controlled by said source.

4. (Currently Amended) The apparatus according to claim 1, wherein

said determining means includes:

means for determining~~, as a highly reliable portion of said speech waveform,~~ a range included in the range extracted by said extracting means, within the range of which change in speech waveform is estimated by said estimating means to be well controlled by said source.

5 – 6. (Canceled)

7. (Currently Amended) An apparatus for determining a portion representing~~, with high reliability,~~ a feature of a speech signal, comprising:

linear predicting means for performing linear prediction analysis on said speech signal;

first calculating means for calculating, based on an estimated value of formant provided by said linear predicting means and said speech signal, a distribution, along time axis, ~~of non-reliability of~~ based on the estimated value of formant;

second calculating means for calculating, based on a result of the linear prediction analysis by said linear predicting means, a distribution, along time axis, of a variance of local spectral change in said speech signal; and

means for estimating, based on the distribution ~~of non-reliability of~~ based on the estimated value of formant calculated by said first calculating means and the distribution of variance of local spectral change in said speech waveform calculated by said second calculating means, a portion of said speech waveform in which a change in said speech waveform is well controlled by said source.

8. (Currently Amended) A program product causing, when executed on a computer, said computer to operate as an apparatus for determining, based on speech waveform data, a portion ~~reliably~~ representing a feature of the speech waveform, said apparatus comprising:

extracting means for calculating, from said data, distribution of energy of a prescribed frequency range of said speech waveform along a time axis, and extracting, among various syllables, a first portion of said speech waveform that is generated stably by a source of said speech waveform, based on the distribution of energy and pitch of said speech waveform;

estimating means for calculating, from said data, a frequency spectrum distribution ~~of spectrum~~ of said speech waveform along the time axis, and estimating, based on the frequency spectrum distribution ~~of spectrum~~, a second portion of said speech waveform, for which change is well controlled by said source; and

means for determining the portion ~~reliably~~ representing a feature of said speech waveform based on the first portion extracted by said extracting means and the second portion.

9. (Currently Amended) The program product according to claim 8, wherein

said extracting means includes:

voiced/unvoiced determining means for determining, based on said data, whether each segment of said speech waveform is a voiced segment or not,

means for separating said speech waveform into syllables at a local minimum of said waveform of energy distribution of the prescribed frequency range of said speech waveform on the time axis; and

means for extracting that range of said speech waveform which includes, in each syllable, an energy peak in that syllable within the segment determined to be a voiced segment by said

voiced/unvoiced determining means and in which the energy of the prescribed frequency range is not lower than a prescribed threshold value.

10. (Currently Amended) The program product according to claim 8, wherein said estimating means includes:

linear predicting means for performing linear prediction analysis on said speech waveform and outputting an estimated value of formant frequency;

first calculating means for calculating, using said data, a distribution ~~of non-reliability of~~ based on the estimated value of formant frequency provided by said linear predicting means on the time axis;

second calculating means for calculating, based on an output from said linear predicting means, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform; and

means for estimating, based both on said distribution on the time axis ~~of non-reliability of~~ based on the estimated value of formant frequency calculated by said first calculating means and on said distribution on the time axis of local variance of spectral change in said speech waveform calculated by said second calculating means, a range in which change in the speech waveform is well controlled by the source.

11. (Currently Amended) The program product according to claim 8, wherein said determining means includes:

means for determining~~, as a highly reliable portion of said speech waveform,~~ a range included in the range extracted by said extracting means, within the range of which change in speech waveform is estimated by said estimating means to be well controlled by said source.

12. (Canceled)

13. (Currently Amended) A program product causing a computer to operate as an apparatus for determining a portion representing~~, with high reliability,~~ a feature of a speech signal, said apparatus comprising:

linear predicting means for performing linear prediction analysis on said speech signal;

first calculating means for calculating, based on an estimated value of formant provided by said linear predicting means and said speech signal, a distribution along time axis ~~of non-reliability of~~ based on the estimated value;

second calculating means for calculating, based on a result of the linear prediction analysis by said linear predicting means, a distribution along time axis of a variance of local spectral change in said speech signal; and

means for estimating, based on the distribution ~~of non-reliability of~~ based on the estimated value of formant calculated by said first calculating means and the distribution of variance of local spectral change in said speech waveform calculated by said second calculating means, a portion of said speech waveform in which a change in said speech waveform is well controlled by said source.

14. (Currently Amended) A method of determining, based on speech waveform data, a portion ~~reliably~~ representing a feature of the speech waveform, comprising the steps of:

calculating, from said data, a distribution of energy of a prescribed frequency range of said speech waveform along a time axis, and extracting, among various syllables, a first portion of said speech waveform, that is generated stably by a source of said speech waveform, based on the distribution of energy and pitch of said speech waveform;

calculating, from said data, a frequency spectrum distribution ~~of spectrum~~ of said speech waveform along the time axis, and estimating, based on the frequency spectrum distribution ~~of spectrum~~, a second portion of said speech waveform, for which change is well controlled by said source; and

determining the portion ~~reliably~~ representing a feature of said speech waveform based on the first portion extracted in said extracting step and the second portion.

15. (Original) The method according to claim 14, wherein

said extracting step includes the steps of:

determining, based on said data, whether each segment of said speech waveform is a voiced segment or not,

detecting a local minimum of said waveform of energy distribution of the prescribed frequency range of said speech waveform on the time axis, and separating said speech waveform into syllables at the local minimum; and

extracting that range of said speech waveform which includes, in each syllable, an energy peak in that syllable within the segment determined to be a voiced segment by said

voiced/unvoiced determining means and in which the energy of the prescribed frequency range is not lower than a prescribed threshold value.

16. (Currently Amended) The method according to claim 14, wherein

said estimating step includes:

performing linear prediction analysis on said speech waveform and outputting an estimated value of formant frequency;

calculating, using said data, a distribution ~~of non-reliability of~~ based on the estimated value of formant frequency on the time axis provided in said step of outputting the estimated value;

calculating, based on the calculated distribution ~~of non-reliability of~~ based on the estimated value of formant frequency on the time axis, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform; and

estimating, based both on said calculated distribution on the time axis ~~of non-reliability of~~ related to the estimated value of formant frequency and on said calculated distribution on the time axis of local variance of spectral change in said speech waveform, a range in which change in the speech waveform is well controlled by said source.

17. (Currently Amended) The method according to claim 14, wherein

said determining step includes the step of:

determining, as a ~~highly reliable~~ portion of said speech waveform, a range included in the range extracted in said extracting step, within the range of which change in speech waveform is estimated in said estimating step to be well controlled by said source.

18 – 19. (Canceled)

20. (New) The apparatus according to claim 1, wherein

said estimating means includes:

a formant estimating unit, which outputs an estimated value of formant frequency based on said speech waveform;

first calculating means for calculating, using said data, a distribution based on the estimated value of formant frequency provided by said formant estimating unit on the time axis;

second calculating means for calculating, based on said speech waveform, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform; and

means for estimating, based both on said distribution on the time axis based on the estimated value of formant frequency calculated by said first calculating means and on said distribution on the time axis of local variance of spectral change in said speech waveform calculated by said second calculating means, a range in which change in the speech waveform is well controlled by said source.

21. (New) The program product according to claim 8, wherein

said estimating means includes:

first calculating means for calculating, using said data, a distribution based on an estimated value of formant frequency;

second calculating means for calculating, based on said speech waveform, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform; and

means for estimating, based both on said distribution on the time axis based on the estimated value of formant frequency calculated by said first calculating means and on said distribution on the time axis of local variance of spectral change in said speech waveform calculated by said second calculating means, a range in which change in the speech waveform is well controlled by the source.

22. (New) The method according to claim 14, wherein

said estimating step includes:

calculating, using said data, a distribution based on an estimated value of formant frequency on the time axis;

calculating, based on the calculated distribution based on the estimated value of formant frequency on the time axis, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform; and

estimating, based both on said calculated distribution on the time axis based on the estimated value of formant frequency and on said calculated distribution on the time axis of local variance of spectral change in said speech waveform, a range in which change in the speech waveform is well controlled by said source

23. (New) An apparatus as recited in claim 1, wherein

said estimating means includes means for calculating, from said data, a frequency spectrum distribution of said speech waveform along the time axis, and estimating the second portion, based on the frequency spectrum distribution, as a portion where local variance of changes of the frequency spectrum is at a local minimum.